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SUCCESS RATE AND COMPLICATIONS OF HYPOSPADIAS REPAIR: A TERTIARY CARE HOSPITAL EXPERIENCE

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Abstract

Introduction: Hypospadias is one of the most widespread congenital disabilities in men that can be surgically corrected to preserve the proper functionality and cosmetic appearance of the penis. Although progress is made, there are still issues concerning complications, particularly in the proximal cases.

Objective: To evaluate the success rate and complications associated with hypospadias repair in a tertiary care hospital setting.

Material and Methods: The study was a prospective observational study conducted at Khyber Teaching Hospital, Peshawar, from 15 January, 2025 to 15 June, 2025. Eighty-six male patients had primary hypospadias repair. The information was documented and processed in terms of surgical methods, complications, and results through SPSS version 25.

Results: Among 86 patients, 54 had distal and 32 had proximal hypospadias. The most frequently applied was TIP urethroplasty. The figure of the total success was 76.70, and complications occurred in 23.30 and consisted of fistula (10.5) and meatal stenosis (5.8).

Conclusion: Most cases of hypospadias repair provide good results, although proximal forms are still susceptible to complications necessitating unique surgical strategies and close monitoring.

Keywords: *Hypospadias, TIP urethroplasty, urethrocutaneous fistula, pediatric urology, surgical outcomes.*

INTRODUCTION

Hypospadias has become one of the most common congenital disorders of males and has also posed outstanding clinical and psychosocial issues due to its possible effects on the urinary system and sexual as well as psychological orientation. The disorder entails incorrect localization of the urethral meatus on the ventral surface of the penis and might be linked with the ventral hook and incomplete foreskin. Surgical correction typically occurs in early childhood to restore standard functionality and

appearance, and several techniques may be used, depending on the extent and severity of hypospadias. With improved surgical techniques, the overall outcome of correction of hypospadias is still inconsistent, and recurrent repair or late complications, including urethrocutaneous fistula, meatal stenosis, and persistent curvature, occur in a significant number of patients (1). The challenging nature of hypospadias repair is reflected in the high reoperation rates observed in various studies. Salvage procedures following unsuccessful primary operations are further complicated by tissue scarring and limited reconstruction possibilities, factors that are highly influential (1). Although distal hypospadias is associated with more favorable outcomes, it may be subject to complications even when managed carefully.

A recently published study at a tertiary care center shows that patient selection, surgical skills, and postoperative care are critical determinants of outcomes, and all care must be taken with what may appear to be an uncomplicated case (2). The fate of hypospadias repair depends on the interaction of various factors, including the patient's age, the type of hypospadias, the surgery procedure to be used, and the surgeon's experience. For example, authors of a study conducted in a tertiary care hospital environment observed that complication rates were considerably higher in cases of more severe hypospadias and employed specific flap techniques (3). Moreover, adolescence and adulthood may reveal functional or cosmetic problems that were not evident during early childhood, thus indicating that a successful repair in the early years does not necessarily imply lifelong happiness (4). Geographical and institutional differences also influence outcomes. Research carried out at the Ethiopian Hospital revealed that both the successful outcome and complication frequency dependence were related to the existence of surgical expertise and clinical character of patients (5).

Similarly, a four-year experience of observation, examining the results of different surgical methods, indicates that the outcomes significantly vary based on the method applied, providing another indication of the importance of choosing a particular technique to produce the best results (6). Health-related quality of life after repair has become a critical issue, and even after the successful anatomy surgeries, patients and their families have stated that there was a post-operative psychosocial distress (7). Adult patients who undergo hypospadias repair have specific problems. Another study aimed at analyzing outcomes in adult patients stated that delayed repair or redo surgeries tend to have an increased rate of complications, implying the necessity to adjust approaches and emphasizing the inability to use techniques developed with a primary focus on pediatric presentations (8). When there are distal hypospadias, flap options, either the tunica vaginalis flap or the scrotal dartos flap, have been directly compared, indicating that flap selection plays a significant role in the occurrence of complications like fistula or glanular dehiscence (9)

Similarly, extensive surgical experience with urethrocutaneous fistula repairs in third-level hospitals underscores the constant difficulty that such a complication poses, even in the hands of highly trained surgical teams (10). The Duckett technique, commonly used in sub-Saharan Africa, has been shown to yield different results depending on surgical dexterity and patient anatomy. Although the method is quite popular, there is a significant likelihood of complications among specific populations (11). Further, redo hypospadias repair, or repeat surgery, frequently reflects more complicated conditions and elevated incidence of morbidity, underlining the paramount value of taking care of the first surgery right (12). Outcomes can also relate to anesthesia. As an example, caudal blocks associated with pediatric surgeries have been linked to high incidences of urethroplasty complications, highlighting the importance of proper planning during perioperative procedures (13).

There are also socioeconomic and logistical issues in resource-limited settings that complicate postoperative follow-ups and timely responses to the occurrence of complications, as described in a retrospective study conducted in Ghana (14). The use of preputial dartos flaps benefited the repair of distal hypospadias in the sense that it led to a lower rate of fistula and meatal stenosis. These findings emphasize that it matters to cover and sustain the neourethra with well-vascularized tissues (15). Conversely, long-term follow-up studies have determined the development of complications such as bulbar strictures many years following childhood repairs, making long-term follow-up plans part of the traditional postoperative procedure (16).

Management of urethrocutaneous fistula, which ranks among the most frequent complications, has seen a tendency towards a minimally invasive approach, yet the recurrence rate is a problem in most tertiary centers (17). Arguments over single-stage versus staged repair, particularly in proximal hypospadias, persist, with research suggesting that both approaches have merits and demerits. Staged repair can decrease the chances of complications but extend the treatment course and may influence patient adherence (18). Recent scoping reviews of the hypospadias literature have revealed significant gaps in long-term follow-up information, uniformity of surgical approaches, and patient-reported outcomes reporting. To demonstrate evidence-based guidelines, there is a need to use multicentric, longitudinal studies (19). Finally, although hypospadias is a urogenital disease, research approaches and experience of completely different surgical specialties, like repair of gastrointestinal atresia, may provide fascinating insights into surgical planning, complications and their management, and postoperative strategies of care (20).

Objective: To evaluate the success rate and identify the types and frequency of complications associated with hypospadias repair procedures performed at a tertiary care hospital in Peshawar over a six-month period.

MATERIALS AND METHODS

Study Design: Prospective Observational Study.

Study Setting: This study was conducted in the Pediatric Surgery department at Khyber Teaching Hospital, Peshawar, which is a tertiary care referral center with dedicated urological surgical facilities.

Duration of study: The study was conducted over a period of six months, from 15 January, 2025 to 15 June, 2025.

Inclusion criteria: They included all male patients aged 6 months to 12 years with hypospadias who were to undergo primary surgical repair. Proximal and distal forms of hypospadias were taken into consideration. Parents or guardians of the participants signed an informed consent form.

Exclusion Criteria: The patients who were previously repaired (redo) and those with significant congenital anomalies were not included in the study, as well as those who were lost to follow-up within the first three months after surgery.

Methods

In all eligible patients, a preoperative assessment was conducted, consisting of a thorough history and physical examination, and the type of hypospadias was determined. Experienced pediatric surgeons employ a standard technique tailored to the type and severity of hypospadias. Traditional treatments include the Tubularized Incised Plate (TIP) urethroplasty for distal forms of hypospadias and staged repair for proximal varieties. Intraoperative parameters, including time and method, as well as the type of flap, were noted. The postoperative treatment included catheterization, prophylactic antibiotics, and daily wound observation. The patients were followed up at 1 week, 1 month, and 3 months to evaluate complications, which included urethrocutaneous fistula, meatal stenosis, glanular dehiscence, and surgical site infection. The definition of success was a regular urinary stream and cosmetic appearance, with no complications after 3 months. A structured pro forma was used to collect data, which was analyzed using SPSS version 25. Categorical variables were processed with frequencies and percentages, and means and standard deviations were considered in the analysis of continuous variables analysis.

RESULTS

There were 86 patients who received hypospadias repair during the study period. The average age of presentation of this condition was 3.4+1.9 years. The proportion of most cases (n=54; 62.8%) were distal hypospadias, and only 32 patients (37.2%) were proximal. Tubularized Incised Plate (TIP) urethroplasty (n=56; 65.1%) was the most frequently applied surgical method followed by staged repair (n=30; 34.9%). The respective success considerable outcome, characterized by a satisfactory aesthetic outcome and a straightened urinary emission with no occasion of complications in a patient at three-month take after, was 76.7% (n=66).

Table 1: Distribution of Hypospadias Types and Surgical Techniques

Hypospadias Type	Number of Patients (%)	Surgical Technique Used
Distal	54 (62.8%)	TIP urethroplasty (n=52), MAGPI (n=2)
Proximal	32 (37.2%)	Staged repair (n=30), Others (n=2)

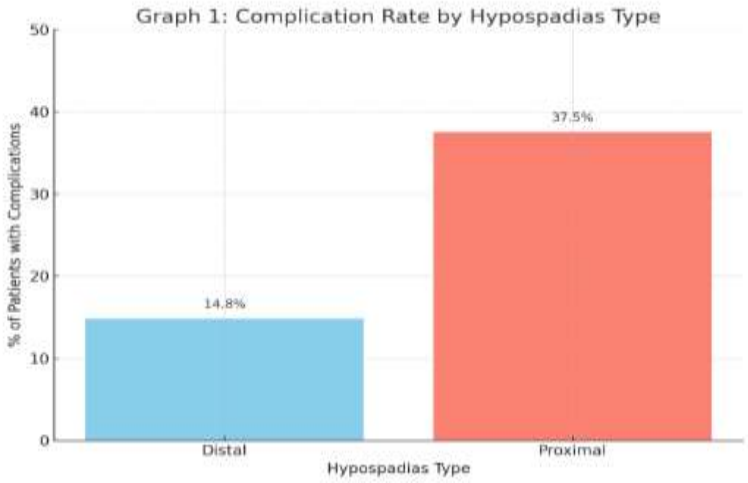
Complication rate was 23.3 per cent (n=20), and the most resistant complication was urethrocutaneous fistula (n=9; 10.5 per cent), followed by meatal stenosis (n=5; 5.8 per cent) and glanular dehiscence (n=4; 4.7 per cent). Two (2.3%) of them had surgical site infections.

Table 2: Postoperative Complications Observed

Complication	Number of Patients (%)
Urethrocutaneous fistula	9 (10.5%)
Meatal stenosis	5 (5.8%)
Glanular dehiscence	4 (4.7%)
Surgical site infection	2 (2.3%)
None	66 (76.7%)

An analysis of the rate of complications of distal and proximal hypospadias demonstrated that the rate of complications in proximal ones (n=12 of 32; 37.5%) was much higher than in distal ones (n=8 of 54; 14.8%).

Graph 1: Complication Rate by Hypospadias Type



It can be seen that chances of complications were more than twice in proximal hypospadias than with the distal forms.

Stay in the hospital was between 2 and 5 days and the average was 3.2 (0.7). The majority of patients with complications needed secondary minor procedures or a long-term follow-up. Out of the 9 patients who got urethrocutaneous fistula, 6 were successfully repaired within the period of study and 3 others had to be repaired in future. Cases of meatal stenosis were treated by routine calibration or small surgery correction.

Table 3: Outcome Summary

Outcome	Number of Patients (%)
Successful repair (no complications)	66 (76.7%)
Complications (any type)	20 (23.3%)
Required secondary surgery	11 (12.8%)
Lost to follow-up	0 (0%)

There were no cases of mortalities and significant systemic complications reported during the study. Overall, the findings indicate a high success rate for the repair of hypospadias, accompanied by an acceptable risk of complications, particularly in cases involving distal repair. The study reveals that the selection of the surgical technique depending on the type of hypospadias is vital in the determination of outcome, and that staged repair in the case of proximal hypospadias is partly connected with the relatively higher rate of complications.

DISCUSSION

Hypospadias is still one of the common congenital disorders of the male urethra, and surgical innovations have so far battled to provide functional and cosmetically acceptable results with the lowest degree of complications, which has remained the present aim of pediatric urologists. The fact that the results of this study have been similar to the world's concern about the outcomes and complications of hypospadias repair surgery is remarkable. The achieved overall success rate of 76.7 percent and complication rate of 23.3 percent correspond to those presented in the pertinent literature, confirming the accuracy of the existing forms of surgical procedures in a tertiary care facility. Our patients had distal hypospadias, with the majority, 62.8 percent, as found in previous studies, being the most prevalent form that requires surgical intervention (2,3). The Tubularized Incised Plate (TIP) urethroplasty has been the most utilized procedure that was applied in proximal or distal instances, and it showed significant results with fewer complications recorded.

This compares with the success rates of Singhal et al. in distal hypospadias repair by TIP in a tertiary care environment, which were high (2). Likewise, Laishram et al. also pointed out that the repair of distal hypospadias, especially the ones performed via a standardized method such as TIP, is associated with fewer complications and enhanced cosmetic results (3). The number of complications was much higher in our cohort, with 37.5per cent of proximal hypospadias patients and 14.8per cent in distal types. This observation is consistent with the literature, which has highlighted the greater technical difficulty, tissue tension, and higher risk of anatomical anomalies in proximal cases (5,6). Tack et al. emphasized that proximal hypospadias is commonly characterized by poor long-term urogenital experiences, and in some cases, several interventions may be needed to address remaining functional and cosmetic problems (4). Moreover, it has been shown that due to the nature of staged repairs, a technique common in our proximal situations, there is an associated greater risk of postoperative complications, including urethrocutaneous fistula and meatal stenosis (6).

The most frequent complications noted in this study were urethrocutaneous fistula (10.5%), followed by meatal stenosis (5.8%) and glanular dehiscence (4.7%). Such findings are not entirely dissimilar to the pattern of complications reported by Gama et al., who, in a retrospective report of hypospadias repair cases, observed that fistula formation was highest during the highest season (5). A similar spectrum of complications was also reported by Gabra et al., supporting their ideas about the necessity of meticulous surgical technique, proper tissue handling, and good vascular coverage as key factors in reducing fistula development (6). Interpositional flaps, such as dartos or tunica vaginalis, have proven to be promising in minimizing such complications (9,15). Health-related quality of life (HRQoL) as a patient-centered outcome is also becoming an essential matter in the surgical management of hypospadias. The importance of HRQoL following repair cannot be overstated, even though it is not directly measured in our study. Bhatia et al. showed that anatomically successful repairs may also be accompanied by psychological stress, stigma, and anxiety in patients and their parents (7).

This highlights the importance of adopting a multidisciplinary assessment and management approach that incorporates both psychosocial support and surgical intervention. Hypospadias in adults or redo surgeries often have a varied range of complications. Goel et al. observed that adult hypospadias repair outcomes are less promising and are associated with increased complications as opposed to children (8). Our analysis did not include redo procedures, although it is essential to note that successful primary repair is a prerequisite to minimizing the burden of later procedures. The technical challenge and the higher morbidity of redo hypospadias repair make extra efforts of primary repair important, as highlighted by Chandra et al. (12). Anesthesia procedures may similarly influence surgical

outcomes. Zhang et al. stated that caudal block is linked to the rise in complications of urethroplasty, which might be related to the possible occurrence of penile edema, influencing wound healing (13). Although in the present study, the data on anesthesia-related outcomes were not specifically analyzed, this must be taken into account in prospective trials.

Moreover, socioeconomic and regional differences might also affect the follow-up and results. A Ghanaian study reported that post-operative care in resource-limited environments tends to be inconsistent, resulting in significant delays in the treatment of complications (14). This study aimed to address this issue by offering structured post-operative appointments. The choice and the technique of surgery and flaps make a great difference. Our results agree with those of Chakraborty et al., who proved the effectiveness of the preputial dartos flap in minimizing fistulae and optimizing urethral repair in distal hypospadias (15). Nevertheless, long-term problems may also occur despite such progressiveness. Faraj et al. raised concerns regarding the possibility of having bulbar strictures many years later, when the patient was already under treatment, which explained the significance of extended monitoring (16).

The practice of treating complications, particularly urethrocutaneous fistulas, is evolving. Omar and Osawa discussed the trend toward less invasive procedures for fistula repair, but noted a high rate of recurrence, especially in proximal repairs (17). Our findings also indicated that more than half of the cases of fistulas required secondary intervention, which is further evidence of the importance of early recognition and conscious planning. Single-stage and staged repair are the two primary debates that have been conducted on hypospadias surgery, especially in proximal cases. Gupta et al. provided indications that staged repair of complex proximal hypospadias may benefit from reducing stress on tissues and minimizing complications (18). The reason behind our staged repairs in proximal cases, though with increased risk of complications, is in keeping with such an argument.

The existing evidence, as indicated by a scoping review by Gozar et al., suggests that standardizing outcome reporting, conducting more extensive follow-ups, and enhancing the incorporation of patient-reported outcomes into hypospadias studies are warranted (19). Although our research has provided a valuable picture of the outcome of surgery, the study has limitations due to its small follow-up period. Assessments of late-presenting complications and psychosocial outcomes should be incorporated in future studies with follow-up into adolescence and adulthood. Lastly, cross-surgical research from even unrelated fields, such as gastrointestinal surgery, can provide beneficial information in managing complications and long-term care measures. In their article determining the consequences of gastrointestinal atresia, Mohamed et al. highlighted the importance of a holistic perioperative treatment and organization of follow-up, principles that can also be applied to hypospadias correction (20).

CONCLUSION

This is a valuable report on the outcomes of hypospadias repair surgery (success rate, complication profile) in a tertiary care institution. Considering all patients, there was a generally good outcome (76.7%). Most patients had positive functional and cosmetic results. Nonetheless, the associated complication rate of 23.3 percent, most of which comprised urethrocutaneous fistula and meatal stenosis, indicates the challenges that still exist regarding hypospadias surgery, especially in proximal ones. These results confirm that the type of hypospadias and the selected procedure are essential factors that determine the outcome. TIP urethroplasty was successful in managing distal cases, but proximal ones, both staged and non-staged ones, had a higher incidence of complications. The correct and early diagnosis, proficient surgical practice, and effective follow-up after surgery are vital in increasing success rates and reducing morbidity. Future studies must underscore long-term follow-up and psychosocial consequences to help further develop surgical interventions to give comprehensive care to patients having hypospadias repair.

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